WATERSPACE

Waterspace Arts Incubator Program - Philippines
Art+Technology+Environment

Book v 2.0 [2016/05/21]
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The opinions, findings, and conclusions stated herein are those of the authors and do not necessarily reflect those of the United States Department of State.

Dr. Andrew Quitmeyer - “Digital Naturalist”
Andy develops infrastructure for doing digital-animal interaction design in the wild.

ABOUT

Waterspace is a workshop program designed and carried out by Andrew Quitmeyer as part of the ZERO1 / US State Department Arts Incubator Program. It consists of a program to develop community skills in art and technology to promote environmental health. This collection illustrates some of the projects we were able to launch during our time together in Dumaguete, Philippines.

BOAT
LAB

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Each project has additional documentation like videos or interactive elements available by searching:

https://www.facebook.com/WaterspaceIncubator

and

https://github.com/Waterspace

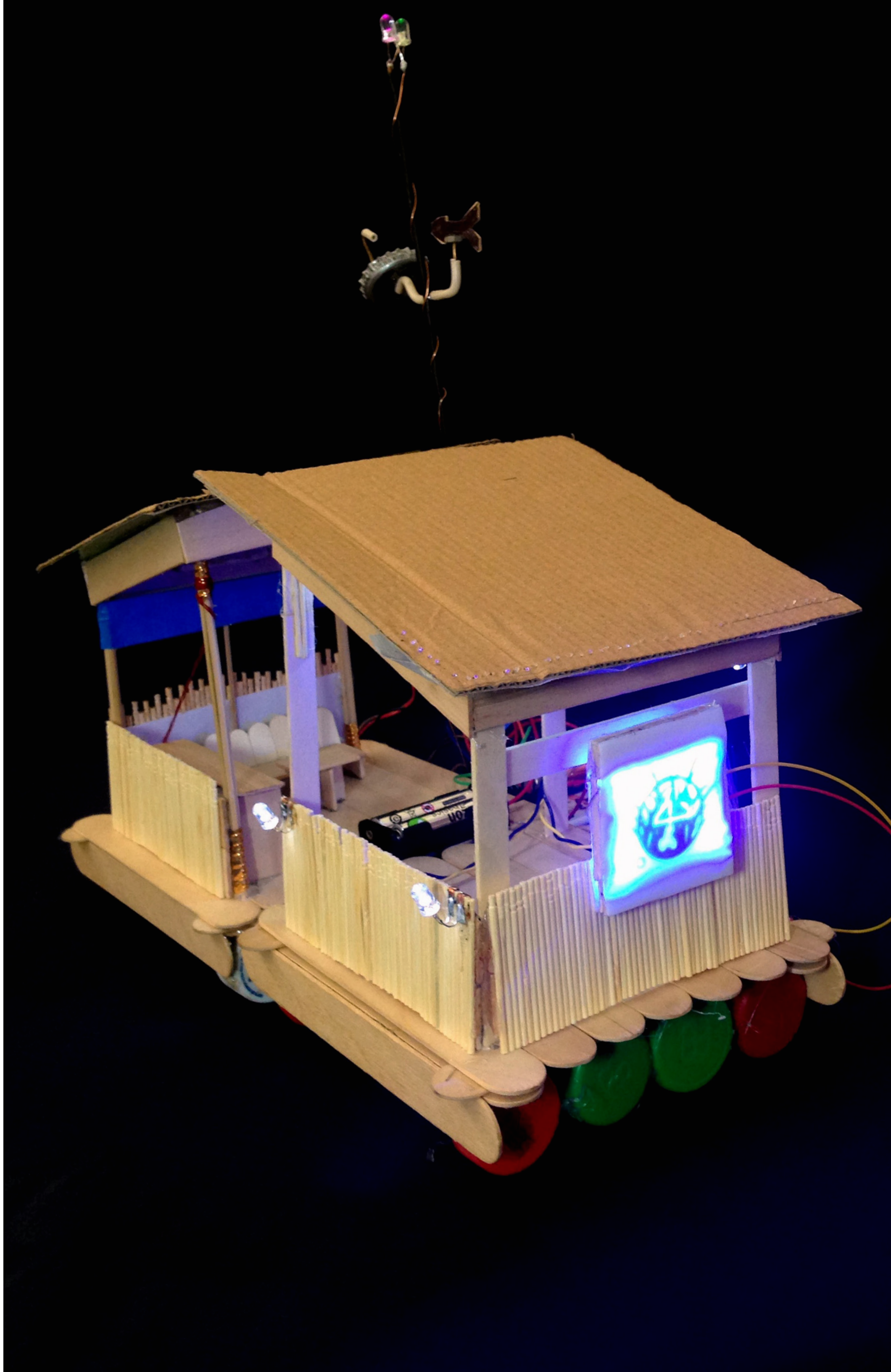
OVERVIEW

The Waterspace program was designed from November 2015 - March 2016. The actual projects were carried out in only three weeks during April 2016 on location in **Dumaguete, Philippines**.

The central idea was to unite **Art** and **Technology** to promote **Environmental Health** in the region.

After scouting many areas, we chose the **Banilad beach** site as our primary field site to study its ecological problems and potential community solutions.

Following a week-long participatory design workshop exploring technical skills and community issues, five main teams emerged to address different topics. All projects connect with a central artwork, the **BOAT Lab**.



TEAMS

BOAT Lab

[Public Art and Technology Hub]

Andrew Mores
Zorich Guia
Oliver
Daryll
Entheos
Andrew Quitmeyer
the Banilad Community
and countless others

Sea Sense

[Scientific Envrionmental Sensing]

Alberto Diego Jr.
Dae Habalo (Lead)
Geraldine Quiñones
Jeffrey Rivera
Andrew Mores
Andrew Quitmeyer

The Viz Initiative

[Information Visualization]

Carl Matheous Simpao (Lead)
Alamein Tabunda
Darren Melon
Loreto Frallon
Jessebel Nemenzo
Neil Villamil

TAPOK

[Community Outreach via Theater]

Diane Young(Lead)
Mary Joy
Al Anth Siplon
Japsy Grey
Mellard Manogura
YATTA Performing Arts Group

F.U.P.P.I

[Plastic Reuse Initiative]

Clint Absin
Christian Bungcasan
Floramae Sioco
Marlon Tanilon
Jobert Kleine Koerkamp (Lead)
Cristina Calisang
Arc Vincent Quisel
Dexter Merced
Razil Binondo

Sustainability

[Keeping Projects Running]

-All Teams-
Edna Plasangga Mariño
The Bantay Basura
Marcelino
Banilad Bantay Dagat
Banilad Community

Documentation

[Sharing Ideas with Others]

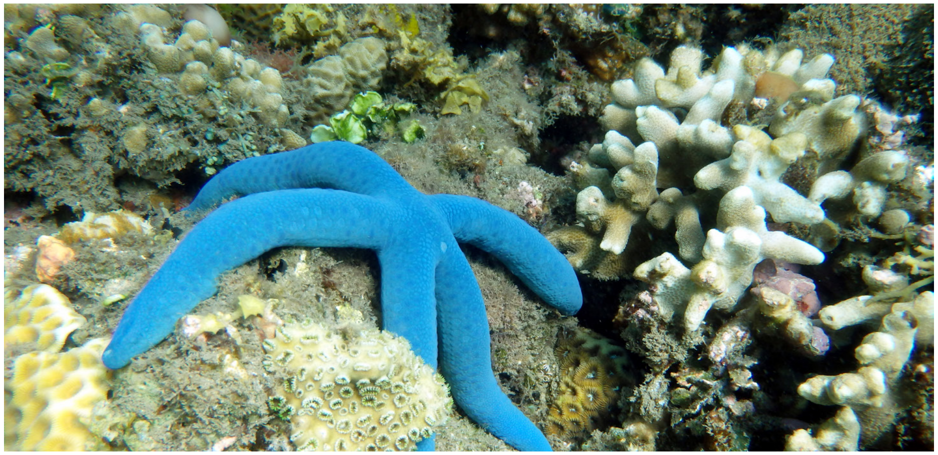
Mark James Kho
Juliet Cuizon
Francis James Kho
Carl Ivan Caballero
Mark Lifana
Jomar Solania
Geraldyn Acibron
Marco Simpao

SITE

Banilad Beach

Banilad Beach is our target site for these projects. It hosts a beautiful coral reef full of rare sea creatures. This environmental treasure, however, is on the brink of destruction.

Situating our projects in this area aims to increase awareness of this precious resource and also provide social and economic incentives to protect the sea.

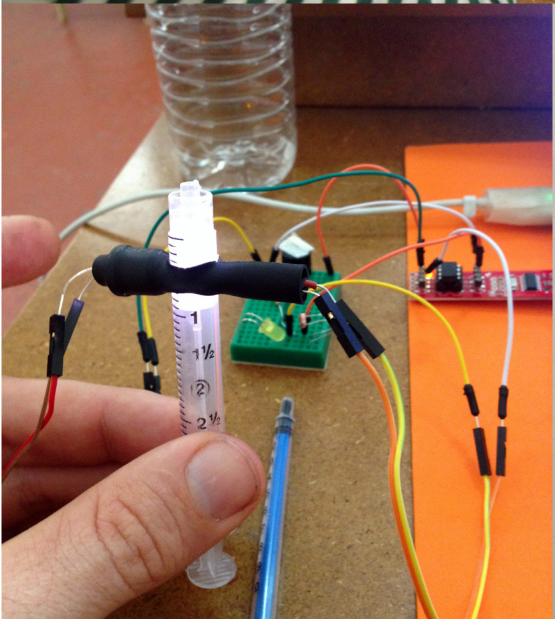


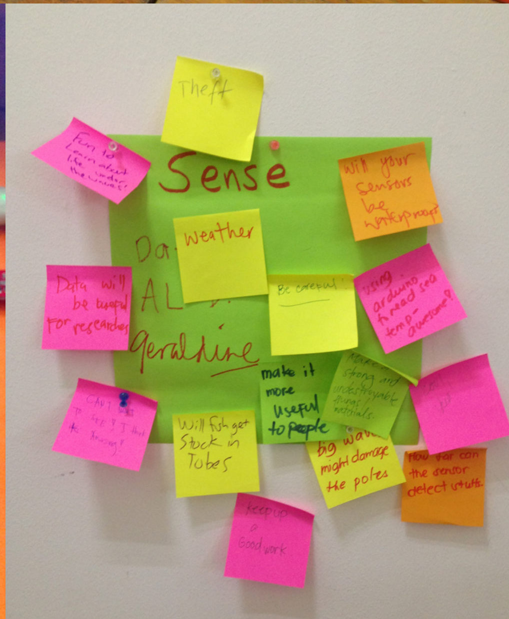
Banilad is a small neighborhood (Barangay) south of Dumaguete. It generally consists of poorer fisherfolk who make a living catching, drying, and selling fish.

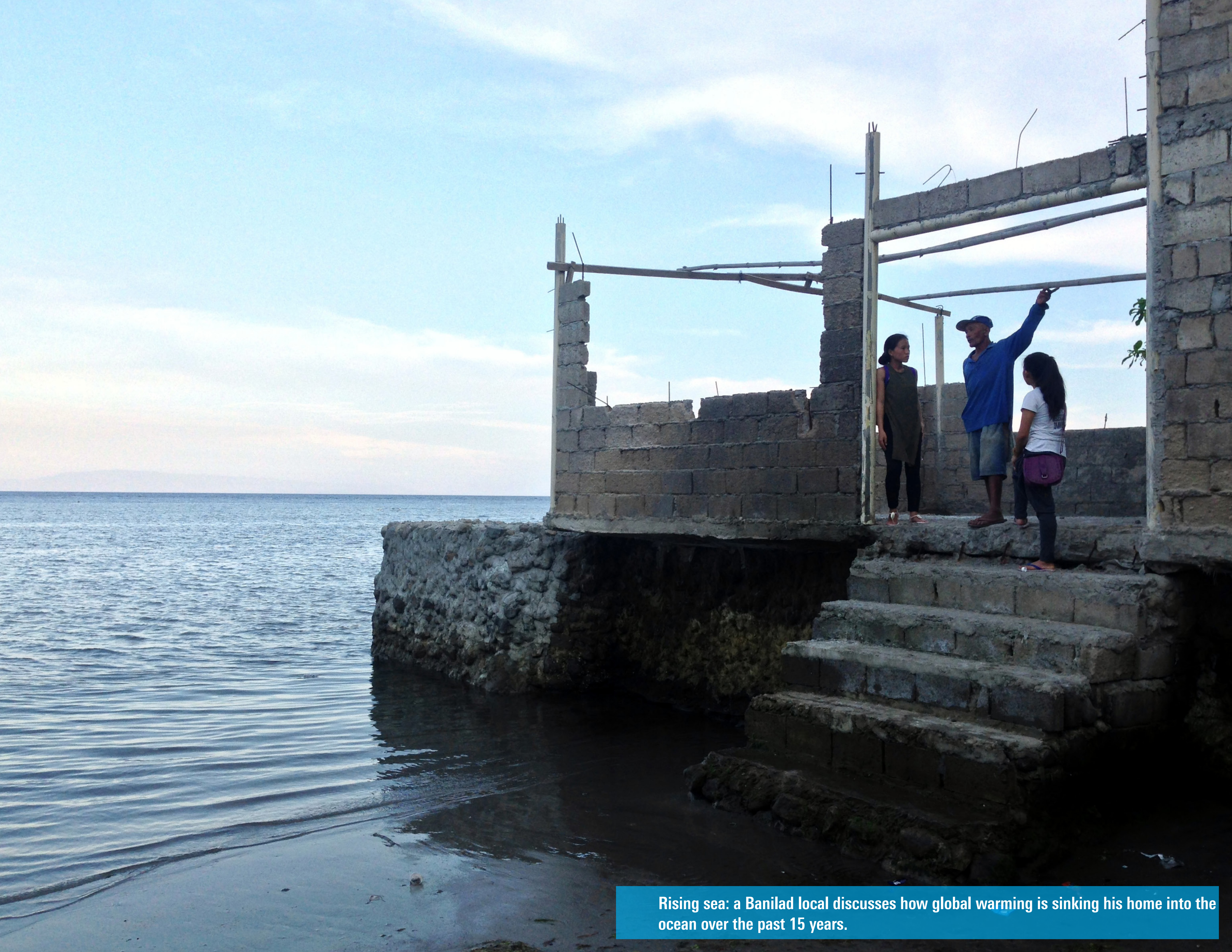
The government recently designated its reef a "Marine Protected Area" where guards (The "Bantay Dagat") are supposed to be paid to prevent destructive fishing or pollution practices. Sadly, lack of funding, public interest, and financial incentives have left this protected area in disrepair. We partnered with the Marine Guards to take ownership of the BOAT Lab, using it as a platform for the community to learn to love and protect their reef.

WORKSHOP

All the teams worked together during our first workshop week. They interviewed villagers around Banilad to discover the environmental and cultural issues important to them. The teams discussed these issues while simulataneously learning how to prototype novel forms of digital technology to sense, react, and share ecological information.




Theft
Fun to Learn about life under the waves!
Sense
Will your sensors be waterproof?
weather
Data will be useful for researches
Be careful!
using arduino to read sea temp - awesome!
Geraldine
make it more useful to people
Make it strong and undestroyable things / materials.
Will fish get Stuck in Tubes
big wave might damage the poles
How far can the sensor detect stuffs.
keep up a Good work



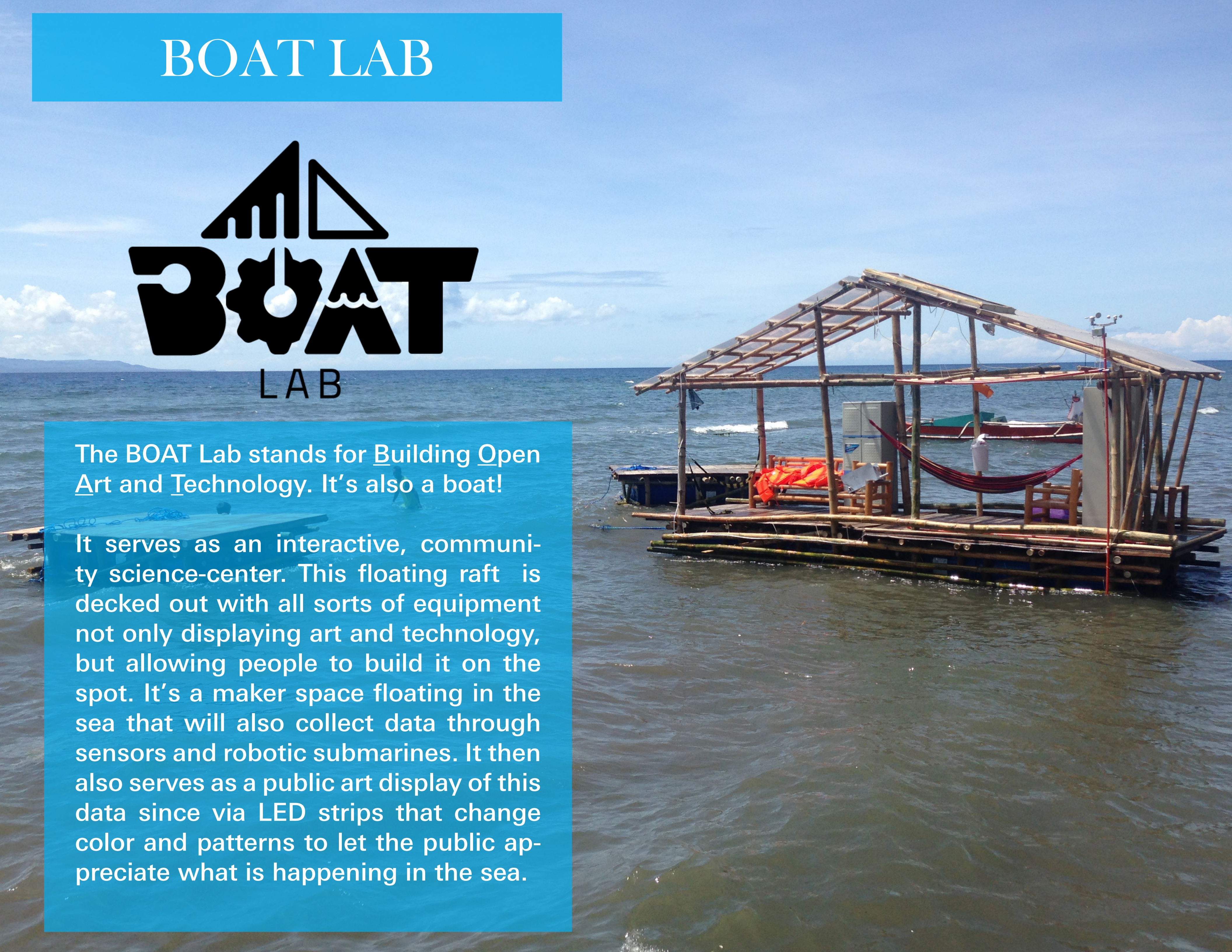
Rising sea: a Banilad local discusses how global warming is sinking his home into the ocean over the past 15 years.

EXPLORATION

BOAT Lab

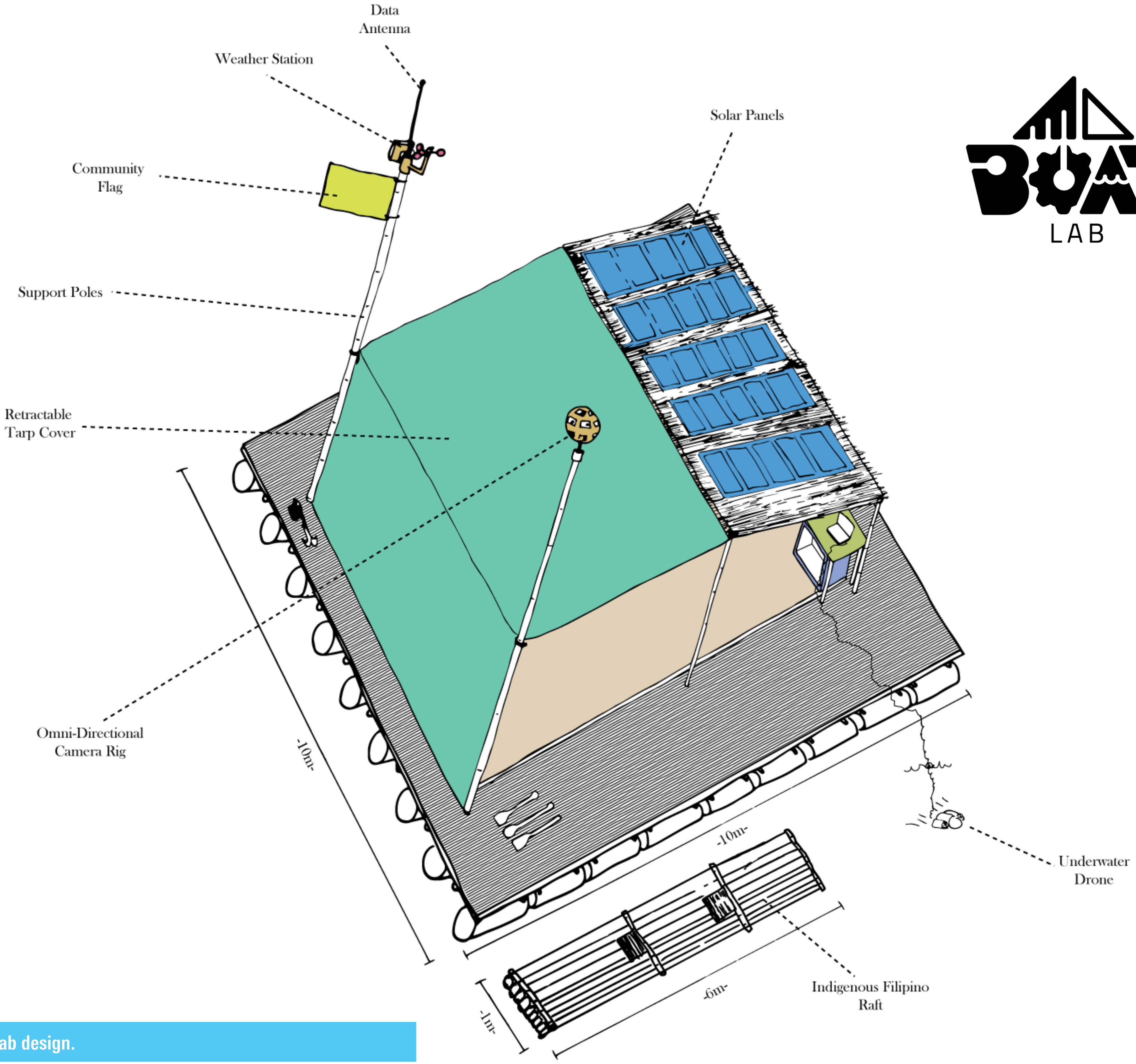
Sea Sense

BOAT LAB



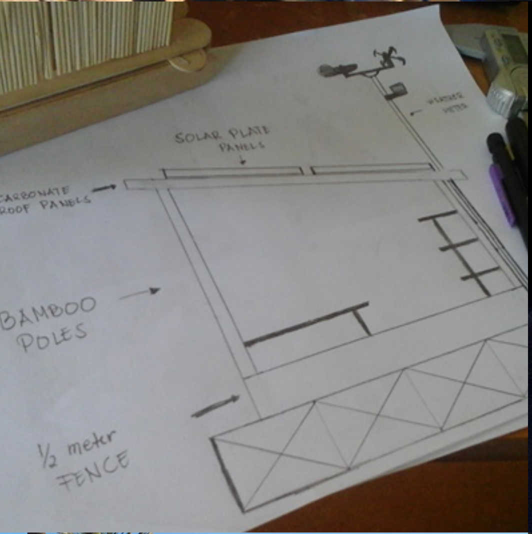
The BOAT Lab stands for Building Open Art and Technology. It's also a boat!

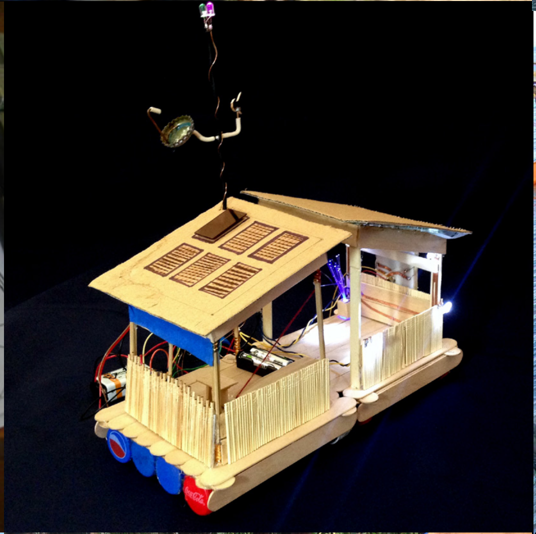
It serves as an interactive, community science-center. This floating raft is decked out with all sorts of equipment not only displaying art and technology, but allowing people to build it on the spot. It's a maker space floating in the sea that will also collect data through sensors and robotic submarines. It then also serves as a public art display of this data since via LED strips that change color and patterns to let the public appreciate what is happening in the sea.



Original BOAT Lab design.

CONSTRUCTION





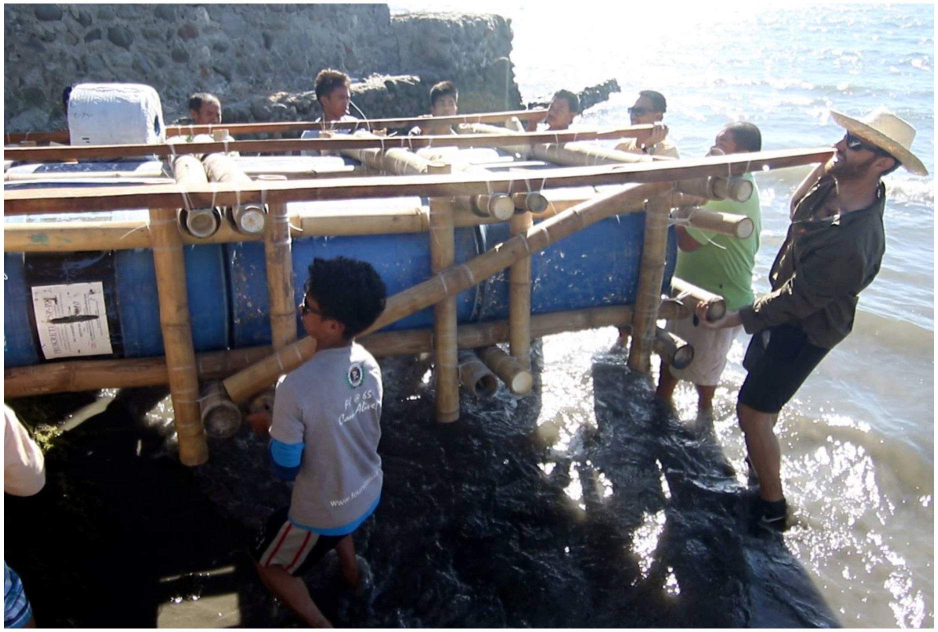
The BOAT Lab was primarily built in just 9 days. It is mostly composed of reclaimed bamboo wood (Kawayan Tinik - salvaged from previous boats), recycled barrels, and nylon string. It was constructed with workers from the local community (fishermen skilled in boat-building), and built using traditional methods. Beams are connected via tensioned knots and special nails carved out of bamboo themselves.

The lab is designed for modularity. The current incarnation consists of four re-configurable 3x4 meter platforms. If one is damaged, it can be taken out and repaired while the remaining lab continues to function. These modules can also function independently as an array of mini-BOAT Labs in different locations.

The lab is self-sustaining and currently powered by a 250w solar panel connected to a solar charger, a 100ah non-spillable battery, and 1000watt inverter. It has 4 anchors which lock it in place.

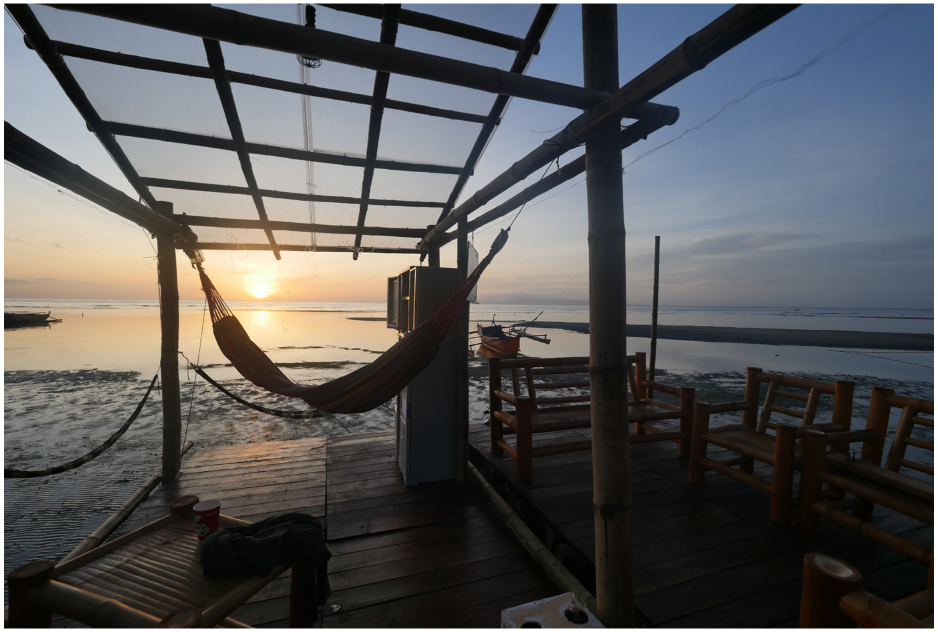
The BOAT Lab (The Building Open Art and Technology Lab) monitors an endangered coral reef. It's a floating makerspace to bring artists, engineers, tourists, and fisherfolk together to understand, explore, and preserve the nearby precious resources hidden under the waves. It's a key figure in the larger Waterspace program created with community members here in Dumaguete. All the teams contribute different We have teams rigging together arrays of Philippine-specific water-quality sensors, performing eco-oriented plays with e-textile costumes, melting collected ocean plastic into new tools, and creating beautiful light-up public artwork on the ocean.

The BOAT Lab itself functions as a central platform for these community projects. It's solar powered, traditionally crafted, modular mobile makerspace floating in the ocean. It has submarine drones, sensors, LED and water-projection systems, and tools to build and repair everything. It's a literal platform providing a rare chance to experience, and empathize, with the hidden undersea environment. Most importantly, it's built and owned by the community, which grants them the agency to direct maintain this project and attack issues most important to them and their precious reef.

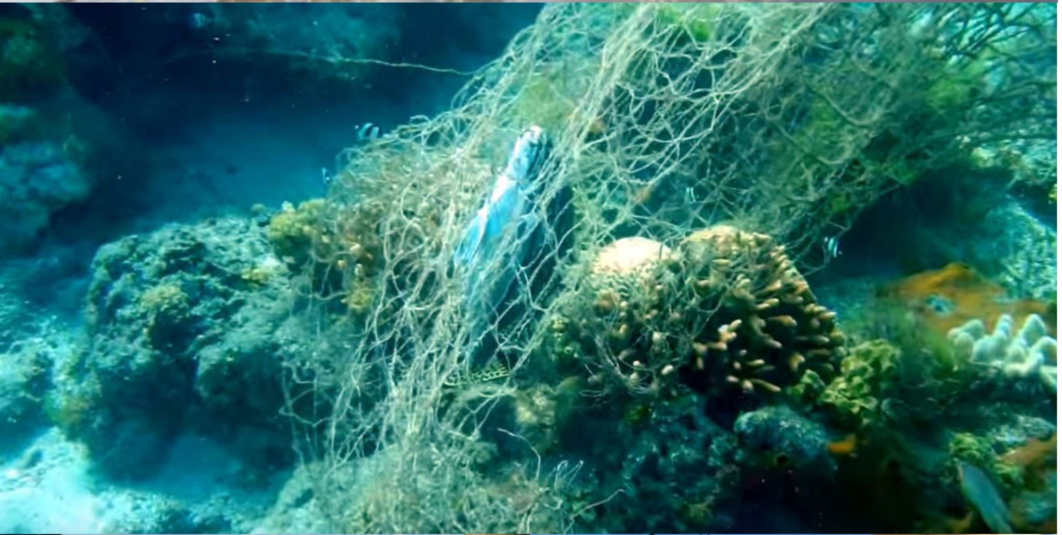


What is your vision for the future of this project?

We hope that this new public facility will have a long life in Dumaguete. It can revitalize the Banilad beach neighborhood, and serve as a symbol for the magnificence under the sea. It will also be a hub for community creators of art, science, and technology. We hope it can be facility that empowers the locals to understand their environment and draw eco-tourists to explore the amazing natural areas in this region.

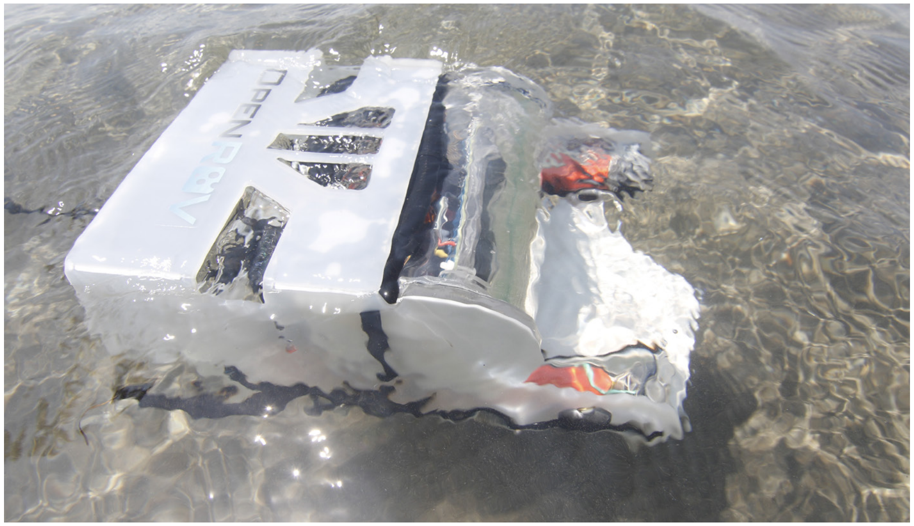


Late night work on the BOAT Lab



One valuable tool on the BOAT Lab is "Sabmarino," our remotely operated undersea drone. This tiny submarine was built from a kit from OpenROV by Waterspace participants.

It allows people to safely explore the underwater environment directly from the BOAT Lab. From there we can visually monitor the health of the reef and identify dangers such as killer discarded fishing nets.



How to install Weather Meters (if you are missing a weather shield) - Andrew Mores

Materials:

1 weather meters (which has a wind speed meter, wind direction meter and rainfall meter - which basically set when you bought it. _)
2 a programmable device. Some of this programmable devices are known as Arduino which has a different kinds of version nowadays.
3 laptop and any personal computer.
Fourth, you need a different kinds of screwdrivers or a kit of tools.

Procedure:

First, make sure you have the necessary materials. Gather all the weather meters in one place and start installing to the Mounting Mast that they have provided using the screwdriver. Most of the weather meters that can bought in shop has a kit of the following: Wind Vane, Cup Anemometer, Tipping Bucket Rain Gauge, Two-Part Mounting Mast, Rain Gauge Mounting Arm, Wind Meter, Mounting Bar, 2 x Mounting Clamps. Just connect that all to the mounting mast.

Next, connect the phone connector into its jack. Note that the Rainfall meter has only two wires. So, you need to solder the two pin wires from the jack so that you can easily connect it into your arduino. Do the same thing for the speed meter and wind direction meter which has four connectors.

Next, connect the wires from your weather meters into arduino. NOTE: Rainfall meters has two wires, one of it is the ground(GND) and connected to pin 2 in Digital in(PWM). Then for the wind speed meter and wind direction meter which basically in one phone connector.

Finally, connect the arduino in your laptop and start programming on it.
Code available at: https://github.com/Waterspace

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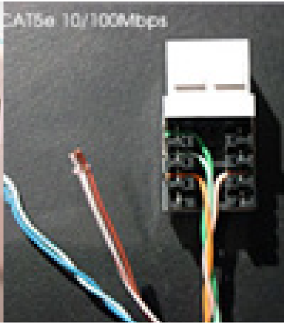

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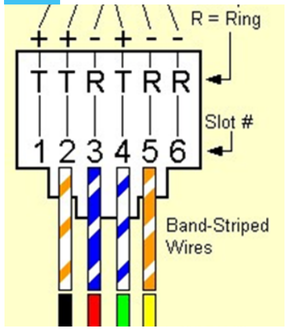
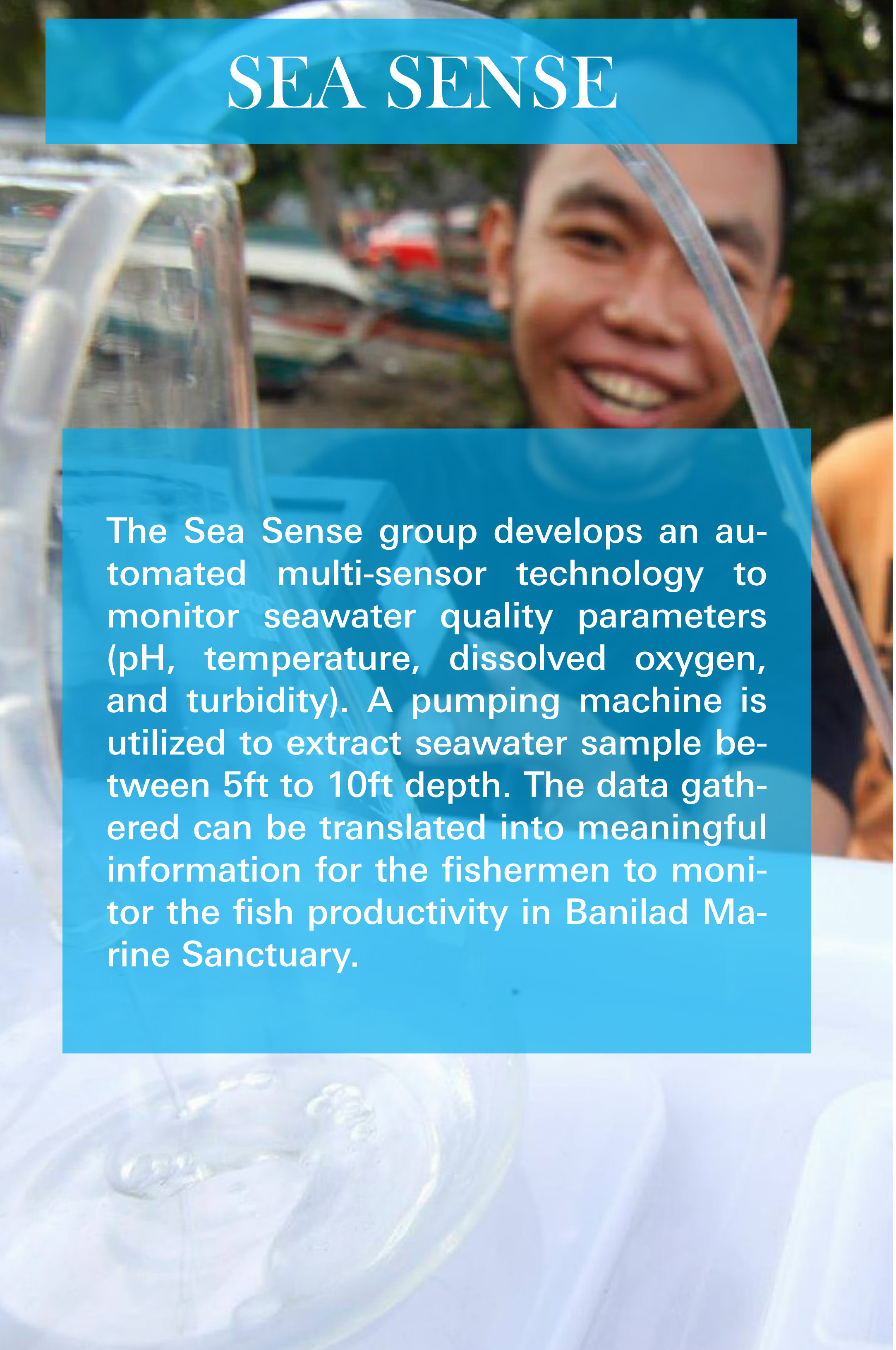
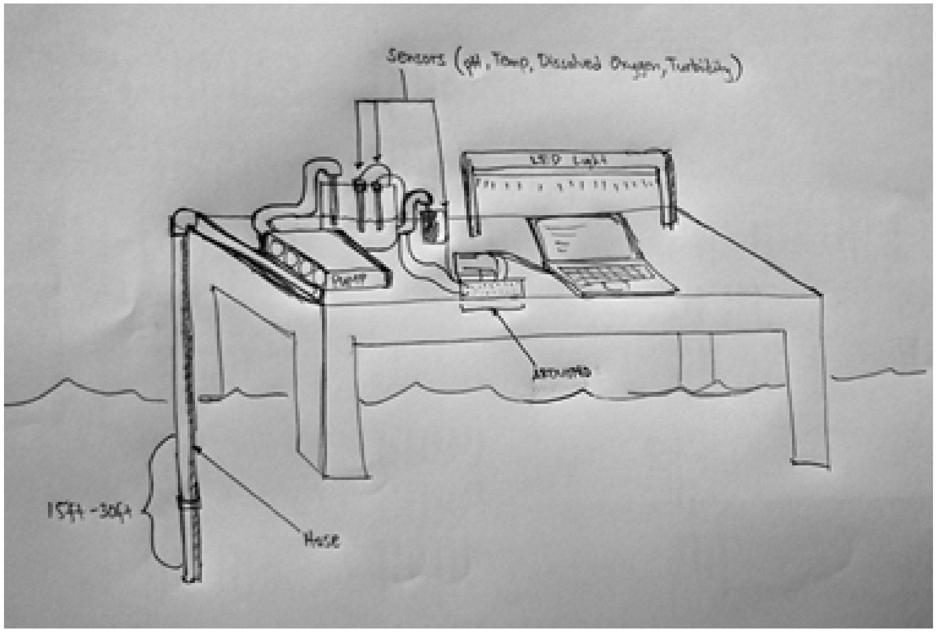




SEA SENSE

The Sea Sense group develops an automated multi-sensor technology to monitor seawater quality parameters (pH, temperature, dissolved oxygen, and turbidity). A pumping machine is utilized to extract seawater sample between 5ft to 10ft depth. The data gathered can be translated into meaningful information for the fishermen to monitor the fish productivity in Banilad Marine Sanctuary.



How does it help the environment?

Climate change impact monitoring by analyzing the sensor reading of the seawater quality parameters.

Minimal marine ecosystem disturbance due to lesser activity of the fishermen in Banilad marine sanctuary.

How does it help people?

Minimize expenses in manual searching for fish because of the automated multi-sensor seawater quality parameter monitoring which can detect fish productivity in the area.

Augment household income through increased fishermen efficiency.

What is the Technological Part of it?

Integration of automated dosing pump for seawater extraction and draining samples back to the sea.

Programmed Arduino microcontroller and circuit board to read the data from four sensors: pH, temperature, dissolved oxygen, and turbidity.

What is the Artistic Part of it?

Reading from the sensors is translated into dancing LED circuit that shows the real-time seawater dynamics.

How does it connect with the BOAT Lab?

The Sea Sense project is installed and mounted on the Boat Lab. The electrical source is taken from the Solar panel attached to the Boat Lab.

What is your vision for the future of this project?

Sea Sense project aims to provide sustainable technology for fish searching for marginalized sector of the fishing community in Negros Island Region (NIR). This vision can be achieved by collecting baseline data from the whole coastal area of NIR through the automated multisensor technology. The primary feature of this technology is extracting seawater and gathering the seawater parameter (e.g. pH, temperature, dissolved oxygen, and turbidity) data through the sensors. The data collected will be analyzed and converted for use in coastal mapping of the potential sites in NIR. Data collection will be done during different monsoons, tidal changes, and lunar period. Initially, this will be presented to the Department of Science and Technology to fine-tune the project by converting it into a portable and durable kit for easy and convenience to fisherfolks. Further, Sea Sense anticipates the presentation of the data gathered in fishery and aquaculture scientific conference.

How to Set-up a schedule pump using Auto Dosing Pump

Materials:

- Auto Dosing Pump
- Rubber tubing
- Nozzle
- Transition tubes
- Power Adaptor
- Power Source

Procedure:

1. Attach firmly the transition tube 1 to the rubber tubing for seawater extraction.

2. Attach firmly the transition tube 2 to the rubber tubing for seawater sample collection.
3. Plug the power adaptor to the power source.
4. Press [ENTER] to enter the menu, then select “Set Program” using the ↑ or ↓ and press [ENTER]
5. Select the pump you would like to program (in this case, pump 1) using ← or →, and then press [ENTER]

6. Using ↑ or ↓ select how many times per day you want the pump to dose. You can choose anywhere from 1 to 24 times per day. Once set, press [ENTER] to move on to the day interval.
7. This can be set from 0 – 30 days, with 0 being no dosing, 1 = every day, 2 = every second day etc. Press [ENTER] again to move on to the dosing volume
8. Press ← or → to select the volume digit, then press ↑ or ↓ to increase or decrease the digit. Maximum volume is 9999ml.
9. Press [ENTER] to set the time you would like the dosing pump to dispense.
10. Press ← or → to select the hours or minutes, then press ↑ or ↓ to increase or decrease. Press [ENTER] to enter the next dosing volume setting. Repeat for each dosing interval. When you have programmed every interval, press [ENTER] to exit to the programming menu, then Esc to exit to the main screen.

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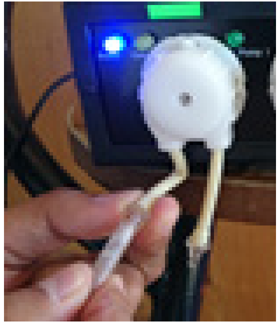

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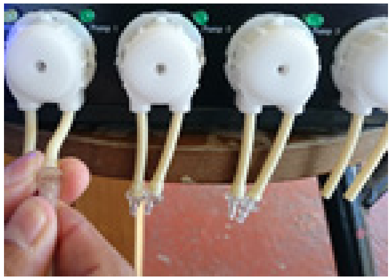

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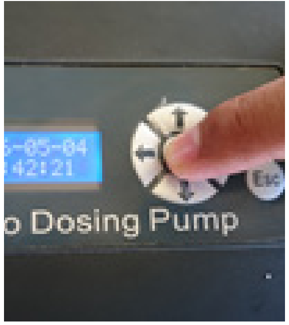

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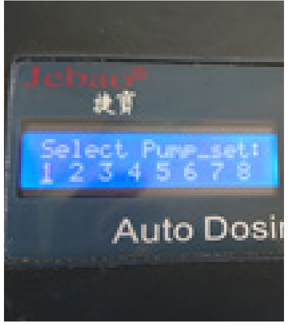

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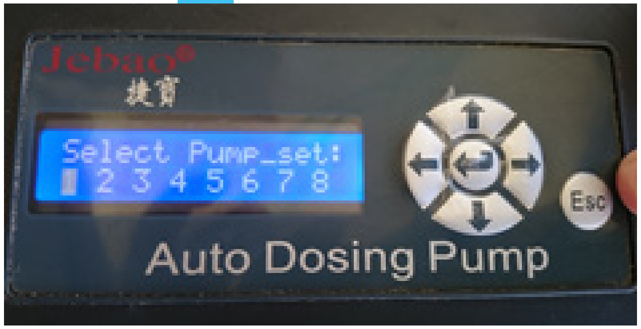
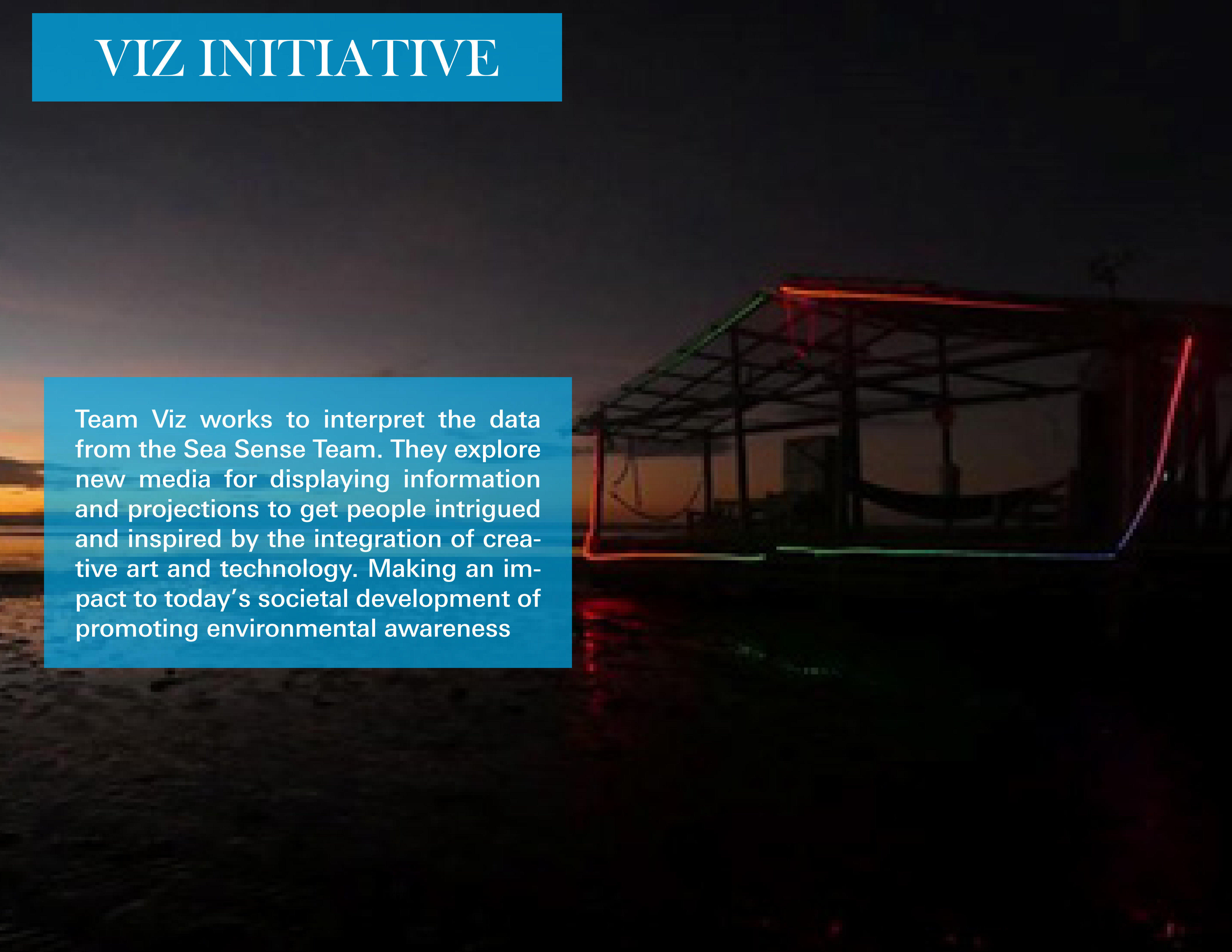


OUTREACH

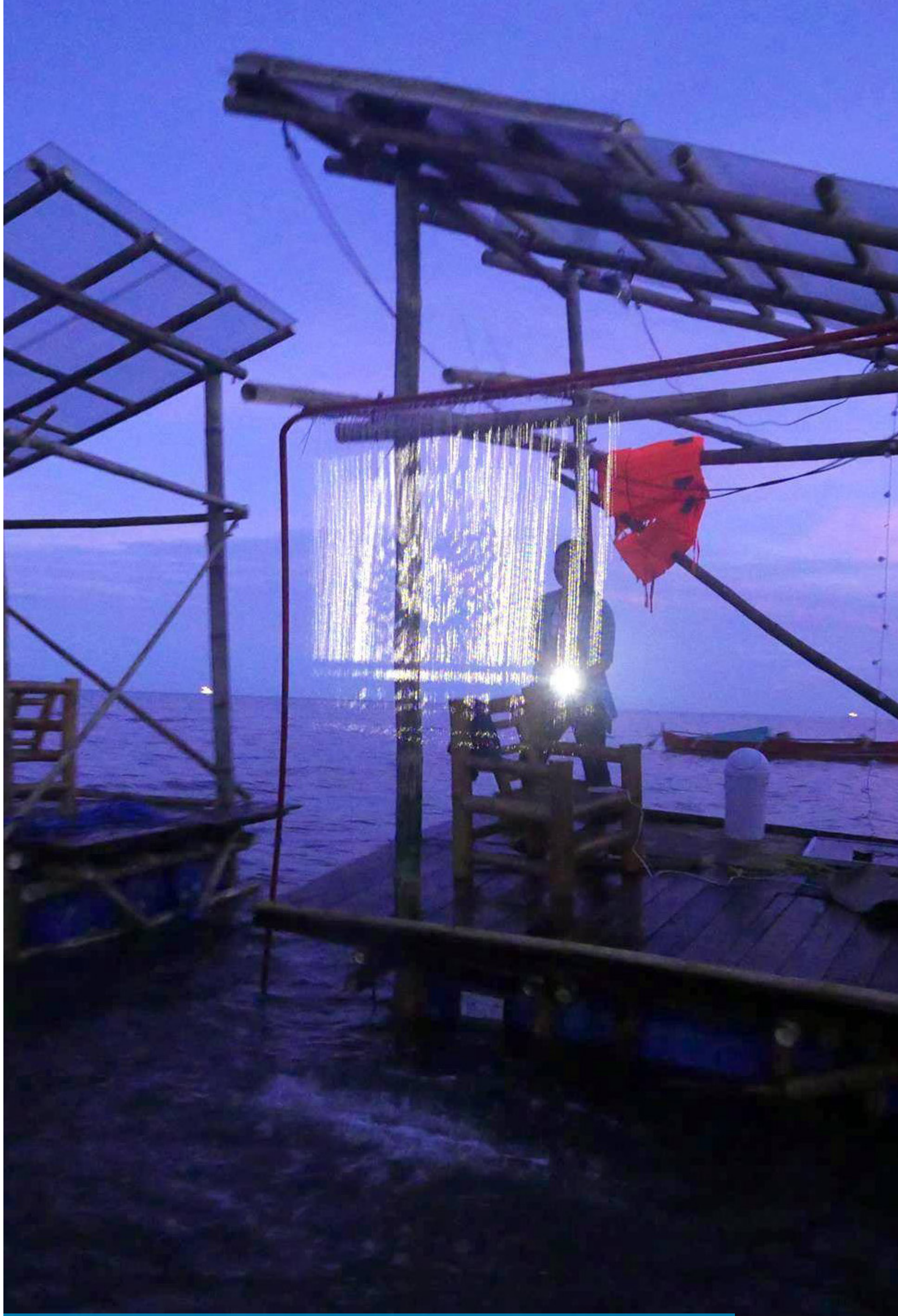
Viz Initiative

TAPOK

VIZ INITIATIVE



Team Viz works to interpret the data from the Sea Sense Team. They explore new media for displaying information and projections to get people intrigued and inspired by the integration of creative art and technology. Making an impact to today's societal development of promoting environmental awareness



Testing a projection screen made from falling water.

The project focuses on environmental awareness by displaying various information about the ocean, the shore and things that are happening around it. This gives the people an insight to share ideas and resolutions to issues regarding the environment. One struggle in this movement is that people are not that interested to listen or even get involved, so in our initiative we created a fog machine, waterfall curtain and a creative dancing LEDs.

Theoretically implementing a new medium of displaying information might spark the interest of people as this is “new” or “unorthodox” way of projecting images, videos or information. In a simple floating projection screen or an awesome hologram or 3D-like display can get people intrigued. With that people can share this cool experience and unknowingly at the same time learning what is happening around the environment.

Technology today plays an important role in society, back then old mediums of media like the newspaper are getting obsolete and today everything seems to be very efficient and effective. Our team would like to use the concept of media but add a little creative twist into it. The projection screen that is made out of water and fog is inspired by different innovators around the world wherein people would get hyped to actually experience seeing one, so our team tries to improvise the designs made by many people and try to build it with the resources we already have.

Creativity or Art also plays an important role in this project because our team tries to stabilize elements (like water or fog) as we can to represent it as a floating platform of projecting series of light particles from the projector.

What is your vision for the future of this project?

The technology that we are using can still be improved and ideas of how we can correlate in helping the environment can keep on coming. Our team hopes on pursuing more opportunities in introducing people new creative mediums in displaying information as well as involve many students, artists and enthusiast to build new ideas on how we can integrate art and technology to help develop our society. In regards to our project, hopefully we can build a better model and use all the experiences we’ve encountered in facing different challenges and problems.

Seeing what the future may be, we are hopeful that the projects would make a great impact to the local people and as well as all institutions to start and build a culture wherein people regardless of any restricted boundaries can be united and realize all together it is in our initiative to uphold a better solution to the issue in our society and visualize the best future in all of us and the generations to come.

How to Create your own Fog Machine Display

Materials:

- Wood
- PVC
- Computer Fans
- Glycerin
- Tea Kettle
- Power Source

Procedure:

1. Step 1 Make a Rectangular Wooden Box
Make a wooden box by cutting out some plywood and nail them together to serve as a container.

Step 2 Insert the 2" Diameter 4 ft long PVC Pipe
Cut open the PVC pipe for the fog to get out and insert it to the wooden box.

Step 3 Insert 12 Fans on Each Parallel Side
Cut a hole on the bottom part of the box to fit the fans and again nail them to permanently stick it on the box.

Step 4 Make a Stack of Straws
This is to control the airflow, glue all the straws together and glue it in the plywood

Step 5 Insert the Wood Divider
After sticking the straw to the plywood, attach it to the platform and let the fog flow through.

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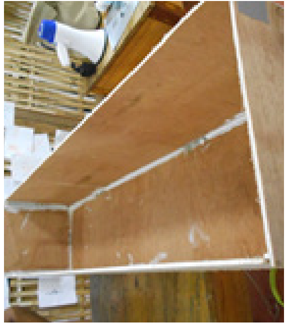

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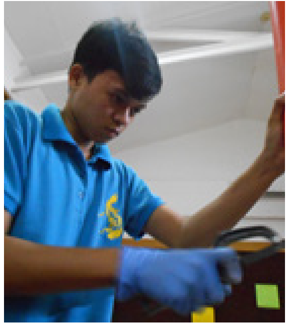

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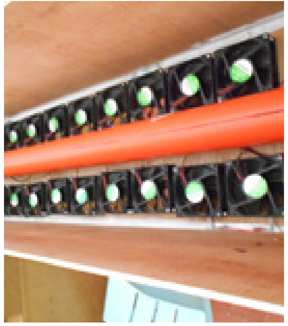

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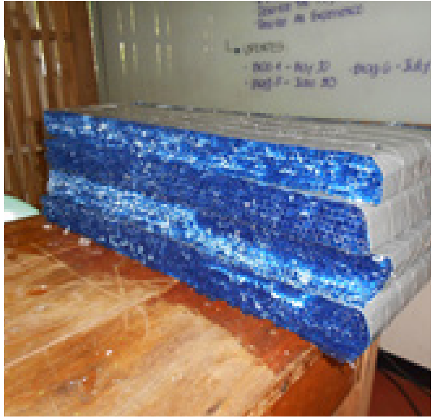

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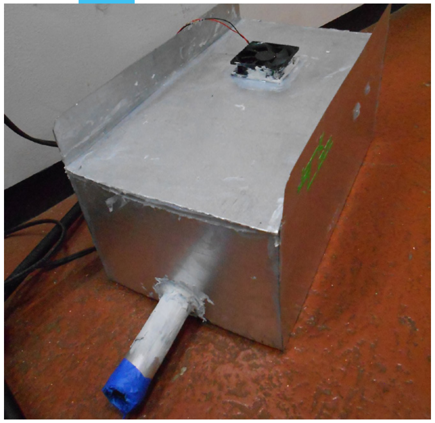
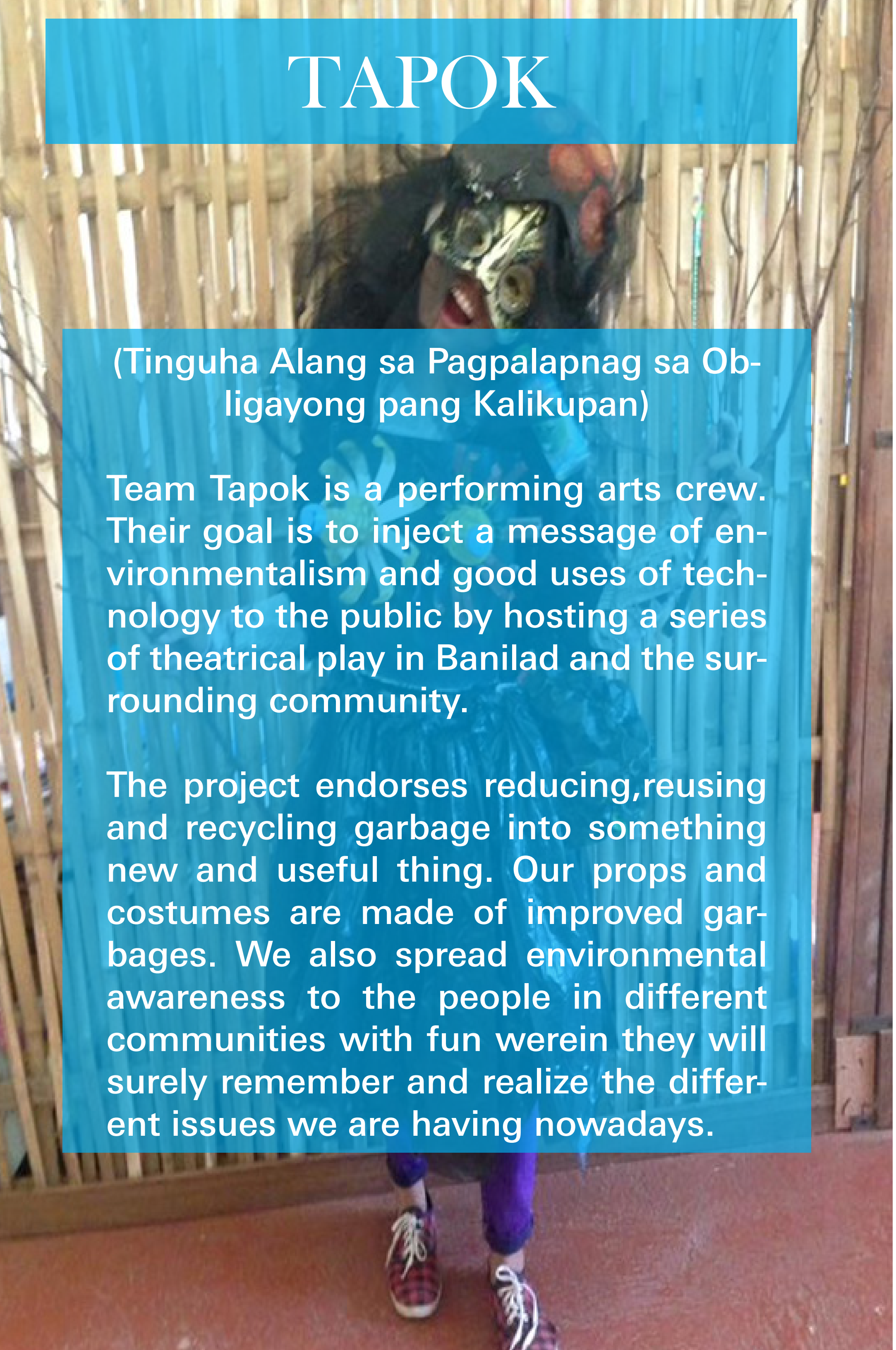


TAPOK



(Tinguha Alang sa Pagpalapnag sa Obligayong pang Kalikupan)

Team Tapok is a performing arts crew. Their goal is to inject a message of environmentalism and good uses of technology to the public by hosting a series of theatrical play in Banilad and the surrounding community.

The project endorses reducing,reusing and recycling garbage into something new and useful thing. Our props and costumes are made of improved garbages. We also spread environmental awareness to the people in different communities with fun werein they will surely remember and realize the different issues we are having nowadays.

The project endorses reducing,reusing and recycling garbages into something new and useful thing. Our props and costumes are made of improved garbages. We also spread environmental awareness to the people in different communities with fun werein they will surely remember and realize the different issues we are having nowadays.

The technological part of it was using the LED lights, LED wires and other things in our props that will bring entertainment and fascination along with the advocacy that we are promoting to the audience. The artistic part of it is the composition of the story, creative drafting of props and costumes, and the team members talent.

Liso ni Laum is a project that promotes environmental awareness through the use of theater arts and technology. This project uses recyclable materials from household to office wastes for our costumes and props. This project helps the people and the environment by providing information about environmental issues and it's provable solutions thus creating a rippling knowledge and actions toward change.

The play will be staged until August of this year just like the rest of the Waterspace projects and the Boat Lab. The play is made more colorful and visually entertaining because of the technologies used such as the LED lights, neodymium magnets and silicone glue which are also present in the Boat Lab.

Due to the presence of environmental issues and wastes which cause pollutions getting worse, people that has been naive and has been tampering our environment, without realizing the consequences after.We may be conceding the fact that it is us being atrocious but it is a fact that we are mishandling our Mother Nature.

What is your vision for the future of this project?

The team TAPOK hopes that this project will not only end this August 2016 but we will do our best to continue the project by tapping some agencies that has the involvement on raising awareness to preserve our Mother Earth.

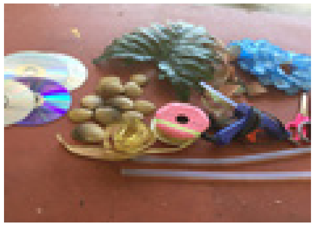
Team TAPOK performs and gives information and advocacy to people specially the youths, the one who are performing for the community to understand the values and to leave with advocacy and thereby to lessen the issues among the communities.

Therefore, team TAPOK will raise awareness through theater arts to acquire unity in achieving a better place and a better future. We will do our best to inform and to give them the knowledge they deserved. Global warming due to illegal cutting of trees, destruction of marine sanctuary like dynamite fishing and pollutions (air,water) .The intense effects of global warming we suffer now are dependent on our actions we take. Mother Earth will either foster nor torture us.

How to make a Magical Themed Headdress

Materials:

Gather all the materials that you can recycle(CD, Flowers, Leaves, Bottle Cup)
Glue gun
Glue sticks
Ribbon
Pair of Scissors
Sea shells



Procedure:

Step 1. Wrap the ribbon around your model’s head.
Step 2. Measure the diameter of the model’s head.

Step 3. Attach the leaf to the ribbon with a glue gun.

Step 4. Cut the disk using a pair of scissors into a triangular shape.

Step 5. Attach the disk into a bottle cap.
Step 6. Add the leaves to the bottle cup.

Step 7. Glue the bottle cup on the ribbon.

Step 8. Final Products!!!

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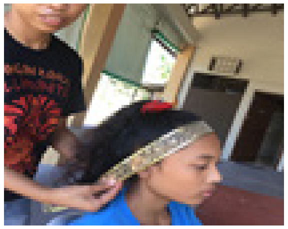

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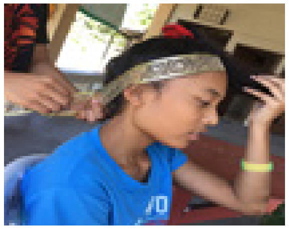

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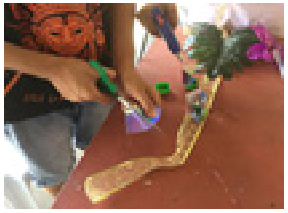

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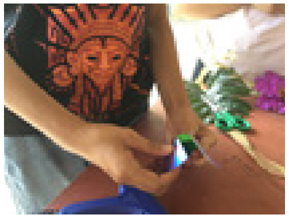

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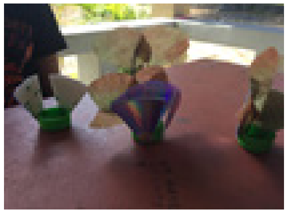

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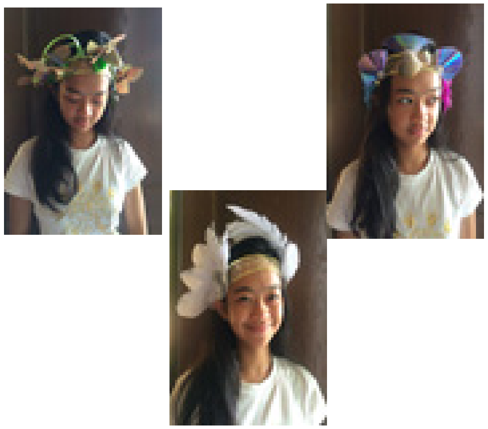


ACTION

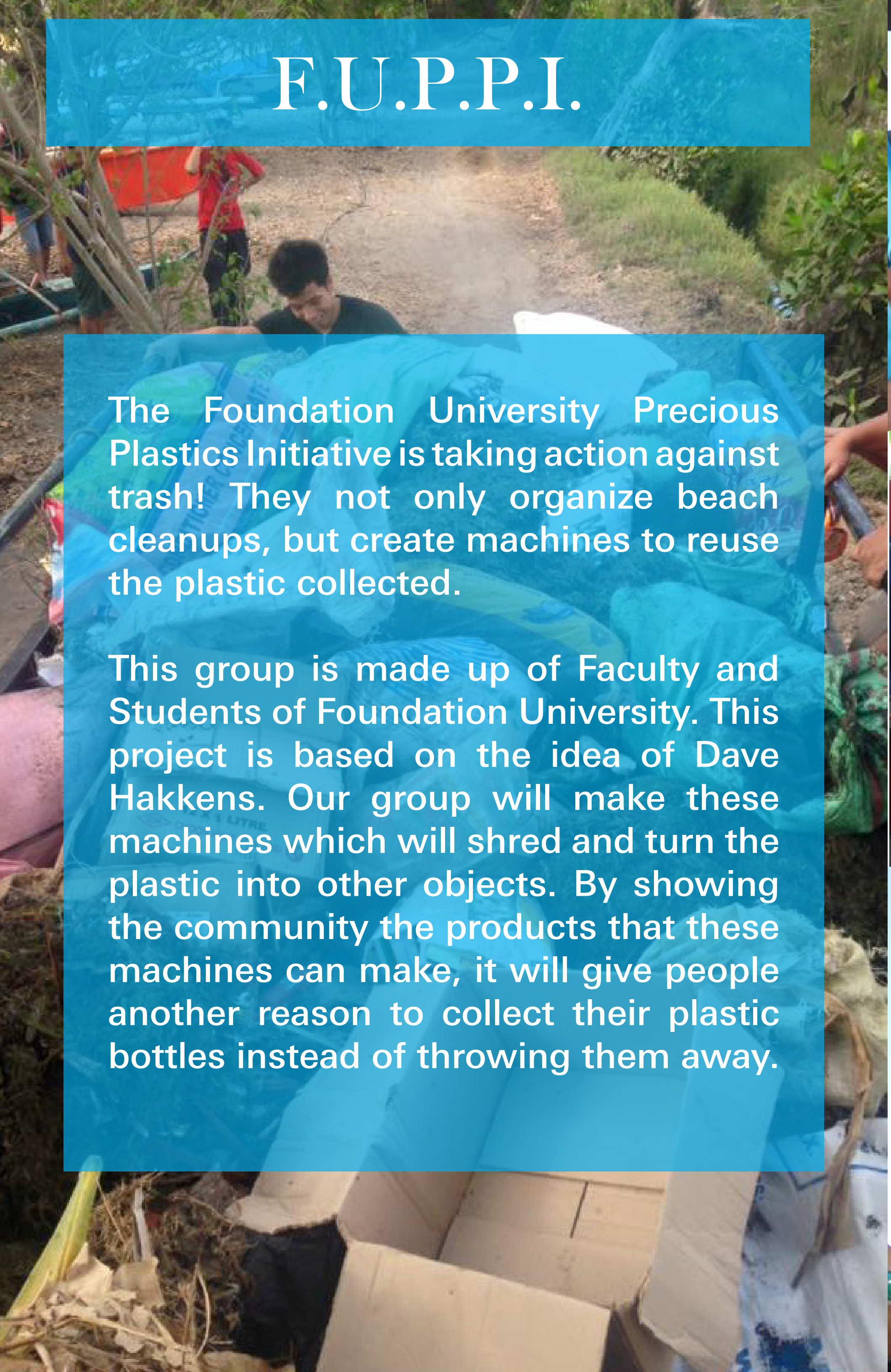
F.U.P.P.I.

Sustainability

F.U.P.P.I.

The Foundation University Precious Plastics Initiative is taking action against trash! They not only organize beach cleanups, but create machines to reuse the plastic collected.

This group is made up of Faculty and Students of Foundation University. This project is based on the idea of Dave Hakkens. Our group will make these machines which will shred and turn the plastic into other objects. By showing the community the products that these machines can make, it will give people another reason to collect their plastic bottles instead of throwing them away.



If you throw your plastic bottles to the side of the road, the river, or the ocean, you, are not good for the environment. But, even if you throw it in the trash bin and have it collected by the garbage truck, it all ends up in one landfill. Yes, there are scavengers there that collect it and sell it to junk shops, but we would like to create an option where people can transform their plastic bottles into something useful. They can either do this singly or as a community. FUPPI is trying to create a shift on how we treat our plastics. Plastics take resources to make and transport and they end up in our streets, oceans, rivers or landfills. Taking our cue from Precious Plastics of Dave Hakkens, we would like to show people the machines that can transform these plastics into something else. Some machines of these machines, like the shredder, will cost over PhP 20,000. The plastic stripper cost only PhP 200. Using these machines, we can turn plastic bottles into pots, strings, containers, and materials for 3D printing. Using these machines we can add value to an otherwise wasted resource.

Is this good for the environment? How can it not be? By providing a means of transforming waste into something of value, thereby potentially giving a small income, not only is this good for the environment, it's good for the people too.

The machines of the Precious Plastics program isn't very complicated, most especially the plastic stripper that we built. These machines are intentionally designed to be easy to build, provided that you have access to the materials and tools. They are quite "low-tech", but low-tech does not mean useless. By keeping these simple, we encourage individuals and groups to make their own recycling machines.

What is your vision for the future of this project?

Our plans got held up by having to source out materials from outside the island. We ran into several delays and back and forth communications. Still, our objectives remain the same; we shall build the machines and show what can be done from plastic bottles. Our vision is that we, in and as part of Foundation University, can show the community that there are different ways to treat our waste products. Instead of throwing them away, use them, recycle them, transform them. If it's a good product, you might even get some money for it.

With these machines and the products they can produce, we will get people interested, we will make a dent in the garbage problem in our waters. We hope that more people build these machines. When the time comes that we can no longer find or buy plastic bottles to feed our machines, when the time comes that we cannot find bottles on the beaches, or on the rivers… when that time comes, the project will have been a success.

How to make an Upcycled Plastic Thread Maker

Materials

Plank of wood
2 bolts
2 nuts
10 washers
1 cutter blade

Procedure

1 Drill 2 holes in the wood plank

2 Insert bolt from one side and washers on the other.

3 Put nut loosely on the bolt on the washer side.

4 Insert blade between washers.

5 Cut the butt end of your plastic bottle. (Water bottles work well, softdrink bottles are a bit too thick for this).

6 Make a small cut at the bottom of the bottle and insert a short strip of it under the blade.

7 Place bottle over one of the bolts. Insert a pipe (of some sort for stability) through the bottle and over a bolt.

8 Pull.

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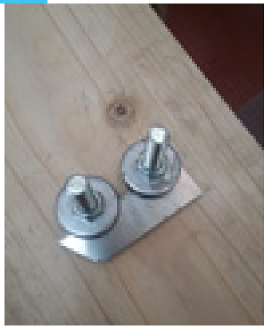

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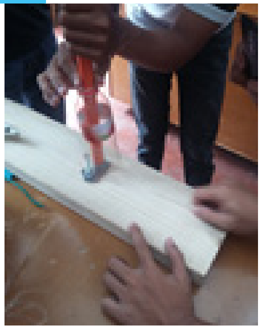

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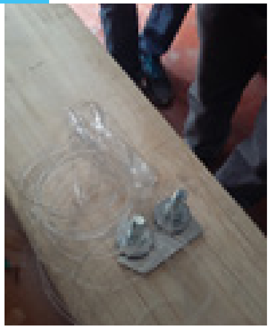

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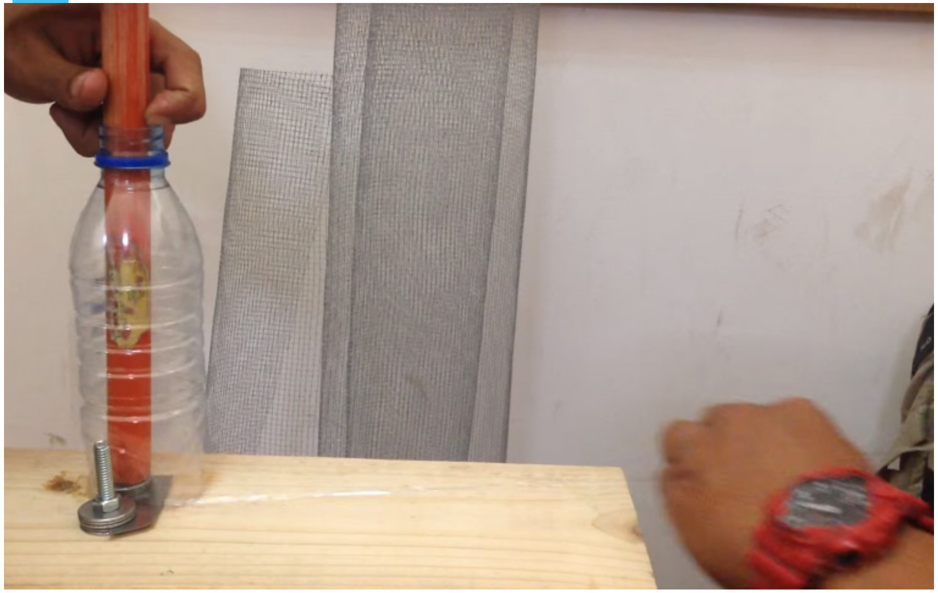


SUSTAINABILITY

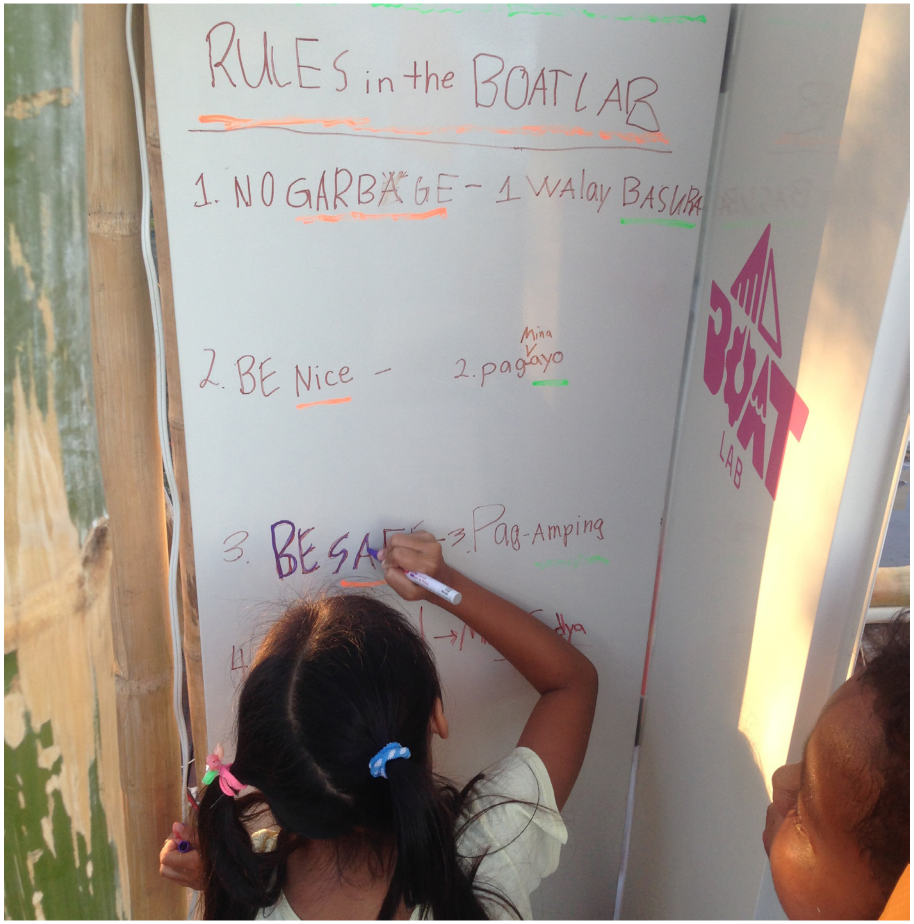
Since our program was required to end after only a few short weeks, several factors were set into place to increase the sustainability of this project.

The teams all have events and workshops scheduled throughout the summer to keep up maintenance and enthusiasm about the projects we have created.

The Banilad Marine Guard is being paid to continue watching over the BOAT Lab, which will become their property in August. They are also being paid to provide free transportation to the BOAT Lab for interested visitors.

Most of all, by building these projects with the community, we share ownership of the BOAT Lab and the Waterspace projects with the local. Hopefully the BOAT Lab will lead to much more exploration and interesting events!

The Bantay Basura (or the "Garbage Guard") consists of a group of community children that we are supporting to help keep the ocean clean. This group of inventive little rascals is helping take this community back from the menace of pollution from the bottom up. Some kids even make their own new toys and tools out of refuse such as large kites and harpoons!



DOCUMENTATION

The documentation team is composed of professionals and interns of Foundation University's Creative Department and the Broadcast Communications Program.

Boat Lab

Waterspace Arts Incubator Program | Philippines 2016